# FLOOD INSURANCE STUDY

# LAPORTE COUNTY, INDIANA
## AND INCORPORATED AREAS

| COMMUNITY NAME | COMMUNITY NUMBER |
|---|---|
| KINGSBURY, TOWN OF | 185228 |
| KINGSFORD HEIGHTS, TOWN OF | 185227 |
| LAPORTE COUNTY UNINCORPORATED AREAS | 180144 |
| LAPORTE, CITY OF | 180490 |
| LACROSSE, TOWN OF* | 180145 |
| LONG BEACH, TOWN OF | 185177 |
| MICHIANA SHORES, CITY OF | 180505 |
| MICHIGAN CITY, CITY OF | 180147 |
| POTTAWATTAMIE PARK, TOWN OF | 185225 |
| TRAIL CREEK, TOWN OF | 185226 |
| WANATAH, TOWN OF* | 185229 |
| WESTVILLE, TOWN OF | 185230 |

*No Special Flood Hazard Area


PRELIMINARY:

Federal Emergency Management Agency

**FLOOD INSURANCE STUDY NUMBER**
**18091CV00A**

## NOTICE TO FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Former flood insurance risk zone designations have been changed as follows:

| Old Zone | New Zone |
|---|---|
| A1 through A30 | AE |
| B | X |
| C | X |

Effective Date:

Revised Dates:

## TABLE OF CONTENTS



## FIGURES



## TABLES

EXHIBITS

**FLOOD INSURANCE STUDY**

LAPORTE COUNTY, INDIANA AND INCORPORATED AREAS

# 1.0 INTRODUCTION

## 1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supercedes the FIS reports and Flood Insurance Rate Maps (FIRMs) in the geographic area of LaPorte County, Indiana, including the Cities of Laporte, Michiana Shores, and Michigan City, the Towns of Kingsbury, Kingsford Heights, LaCrosse, Long Beach, Potawattamie Park, Trail Creek, Wanatah, and Westville, and the unincorporated areas of Laporte County (hereinafter referred to collectively as LaPorte County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. This information will also be used by LaPorte County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

Furthermore, the Towns of LaCrosse and Wanatah do not have special flood hazard areas within their incorporated limits. However, for the purpose of complete county-wide mapping of LaPorte County, these towns are still included in this FIS and FIRMs.

## 1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Information of the authority and acknowledgements for each of the new studies and previously printed FIS reports and Flood Insurance Rate Maps (FIRMs) for communities within LaPorte County was compiled and is shown below:

City of Michigan City: The previously effective FIS for the City of Michigan City is dated February 17, 1981. The hydrologic and hydraulic analyses for this study were performed by Clyde E. Williams & Associates, Inc., for the Federal Insurance Administration, under Contract No. H-4013. This study was completed in December 1977 (Reference 1).

New Studies: The hydrologic and hydraulic analyses for approximate stream reaches of LaPorte County were performed by Christopher B. Burke Engineering Ltd., on behalf of the Indiana Department of Natural Resources, under Indiana Public Works Project Number E068104. The Indiana Department of Natural Resources managed the production of this study as part of their Cooperating Technical Partner agreement with the Federal Emergency Management Agency dated April 29, 2004, which was defined by the Indiana DNR Mapping Activity Statement 06-10 dated June 22, 2006 and funded under agreement number EMC-2006-GR-7016.

Redelineation of the previously effective flood hazard information for this FIS report, correction to the North American Vertical Datum of 1988, and conversion of the unincorporated and incorporated areas of LaPorte County into the Countywide format was performed by Christopher B. Burke Engineering Ltd., on behalf of the Indiana Department of Natural Resources, under Indiana Public Works Project Number E068104. The Indiana Department of Natural Resources managed the production of this study as part of their Cooperating Technical Partner agreement with the Federal Emergency Management Agency dated April 29, 2004, which was defined by the Indiana DNR Mapping Activity Statement 06-10 dated June 22, 2006 and funded under agreement number EMC-2006-GR-7016.

## 1.3 Coordination

The purpose of an initial Consultation Coordinated Officer's (CCO's) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study. The dates of the initial and final CCO meetings held for the previously effective FIS reports covering the geographic area of LaPorte County, Indiana are shown in Table 1 (Reference 1). The initial and final CCO meetings were attended

by the study contractor, FEMA (or the Federal Insurance Administration), the Indiana Department of Natural Resources (IDNR), and the affected communities.

Table 1: CCO Meeting Dates for Pre-Countywide FIS

| Community Name | Initial CCO Date | Final CCO Date |
|---|---|---|
| Michigan City, City of | March, 1976 | May 21, 1980 |

For this countywide FIS, an initial CCO meeting was held on August 30, 2005, and was attended by IDNR and representatives from the Cities of Michiana Shores, LaPorte, Michigan City, the Town of Trail Creek and LaPorte County.

The results of the countywide study were reviewed at the final CCO meting held on enter_date, and attended by representatives of FEMA, IDNR and enter_attendees. All problems raised at that meeting have been addressed.

## 2.0 AREA STUDIED

### 2.1 Scope of Study

This FIS covers the geographic area of LaPorte County, Indiana, including the incorporated communities listed in Section 1.1

All FIRM panels for LaPorte County have been revised, updated, and republished in countywide format as a part of this FIS. The FIRM panel index, provided as Exhibit 2, illustrates the revised FIRM panel layout.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards as identified during the initial CCO meeting. For this study, twenty-five (25) new stream reaches and four (4) lakes were studied using approximate methods (Table 5). The scope and methods of new approximate studies were proposed and agreed upon by FEMA, the IDNR, and LaPorte County.

The areas studied by detailed methods were selected with priority given to all known flood hazards areas and areas of projected development of proposed construction. This study incorporates new detailed studies of White Ditch, performed for and approved by IDNR (Table 3).

This FIS update also incorporates the determination of letters issued by FEMA resulting in map changes (Letters of Map Change, or LOMC's). All Letters of Map Revision (LOMR's) are summarized in Table 2. Letters of Map Amendment (LOMA's) incorporated for this study are summarized in the Summary of Map

Actions (SOMA) included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the TSDN may be obtained from the Community Map Repository.

Additionally, predicted stillwater elevations for open-coast flood levels for Lake Michigan are listed with this FIS update (Table 6). These levels were developed by the USACE, and were recorded in the 1988 revised report on open-coast flood levels (Reference 10).

Table 2: Incorporated Letters of Map Change

| Flooding Source | Community and Project Id | Date Issued | Type |
|---|---|---|---|
| Striebel Arm - Kintzele Ditch | 180144 / 06-05-B876P | July 31, 2006 | LOMR |

Table 3: Streams Studied by New Detailed Methods

| Flooding Source | Limits of Detailed Study |
|---|---|
| White Ditch | State line to Michigan City Corp. Limit |

Table 4: Streams Studied by Detailed Methods from Prior Studies

| Flooding Source | Limits of Study |
|---|---|
| Beck Ditch | Confluence with Otter Creek to Kawick Road |
| Deer Creek | Mouth to Meer Road |
| Kimball Ditch | Mouth to Duneland Beach Drive |
| North Branch Deer Creek | Confluence with Deer Creek to 900' downstream of S.R. 212 |
| Otter Creek | Confluence with Trail Creek to Kawick Road |
| Striebel Arm – Kintzele Ditch | County line to Louisville & Nashville Railroad |

Table 4: Streams Studied by Detailed Methods from Prior Studies (cont.)

| Flooding Source | Limits of Study |
|---|---|
| Trail Creek | Confluence with Otter Creek to Michigan Boulevard |
| Trail Creek | Mouth to Town of Pottawattamie Corp. Limit |
| Unnamed Tributary Striebel Arm[1] | Confluence with Striebel Arm to Ohio Street |
| White Ditch | Michigan City Corp. Limit to upstream Michigan City Corp. Limit |

[1] Included with the Striebel Arm – Kintzele Ditch Detailed Study

Table 5: Streams Studied by Approximate Methods

| Flooding Source | Limits of Study |
|---|---|
| Cheneys Run | Norfolk & Western Railroad to Worbel Avenue |
| East Arm Little Calumet River | County Line to 860' upstream of U.S. Hwy. 421 |
| Unnamed Tributary East Arm Little Calumet River | Mouth to Interstate 80/90 |
| East Branch Trail Creek | Mouth to 1200' upstream of C.R. 300 W |
| Fish Creek | C.R. 200 S to upstream limit of Zone A |
| Forbes Ditch | B&O Railroad to upstream limit of Forbes Ditch |
| Kankakee River | County line to LaPorte-St. Joseph County Line |
| Kingsbury Creek | Confluence with Travis Ditch to State Hwy. 39 |
| Little Kankakee River | C.R. 700 East to State Hwy 2 |

Table 5: Streams Studied by Approximate Methods (cont.)

| Flooding Source | Limits of Study |
|---|---|
| Mill Creek | Confluence with Little Kankakee River to C.R. 200 South |
| Mill Creek | Confluence with Mill Creek Tributary to 2775 upstream of C.R. 500 West |
| Porter Ditch | C.R. 1025 South to 1600' upstream of Young Road |
| Trail Creek | Michigan Blvd. to U.S. Highway 20 |
| Travis Ditch | C.R. 1000 South Road to 1875' upstream of C.R. 250 South |
| Unnamed Tributary East Branch Trail Creek (1) | C.R. 625 North to 600' upstream of U.S Highway 20 |
| Unnamed Tributary East Branch Trail Creek (2) | 600' upstream of U.S. Highway 20 to 1075' north of C.R. 450 North |
| Unnamed Tributary Mill Creek (1) | Confluence with Mill Creek to 1632' upstream from confluence with Mill Creek |
| Unnamed Tributary Mill Creek (2) | 1632' upstream of confluence with Mill Creek to 2384' downstream of C.R. 400 South |
| Unnamed Tributary Mill Creek (3) | 2384' downstream of C.R. 400 South to C.R. 400 South |
| Unnamed Tributary Mill Creek (4) | Confluence with Mill Creek to 2500' upstream of B&O Railroad |
| Unnamed Tributary West Branch Trail Creek (1) | Confluence with WBR Trail Creek to 3500' upstream of U.S. Hwy. 421 |

Table 5: Streams Studied by Approximate Methods (cont.)

| Flooding Source | Limits of Study |
|---|---|
| Waltham Ditch | Mouth to confluence with Mill Creek |
| West Branch Trail Creek | Johnson Road to C.R. 950 West |
| Wolf Run | Interstate 94 to 2630' upstream of C.R. 600 West |
| Wright Arm | Upstream limit of Forbes Ditch to 5145' upstream of Norfolk & Western Railroad |
| Hudson Lake | N/A |
| Pine Lake | N/A |
| Saugany Lake | N/A |
| Silver Lake | N/A |

Table 6: Stillwater Elevations (USACE Lake Michigan Open-Coast Flood Levels)

| Probability of Exceedance | Lake Michigan Elevation Feet (NAVD 88*) |
|---|---|
| Predicted 10%-Annual-Chance Lake Level | 583.2 |
| Predicted 2%-Annual-Chance Lake Level | 584.3 |
| Predicted 1%-Annual-Chance Lake Level | 584.7 |
| Predicted 0.2%-Annual-Chance Lake Level | 585.6 |

*North American Vertical Datum1988

## 2.2 Community Description

LaPorte County is located on the Northern border of Indiana and is bordered by Lake Michigan and Berrien County, Michigan to the north, St. Joseph County to the east, Stark County to the south and Porter County to the west. LaPorte County is located approximately 25 miles west of Gary, Indiana. LaPorte County is served by US route

35, and State Routes 2 and 4. According to STATS Indiana, the projected population of LaPorte County in 2005 was reported to be 110,512 (Reference 2).

The climate in Laporte County can be characterized as "four seasonal" and "moderate". The presence of Lake Michigan provides a tempering effect, cooling during the summertime and warming in the winter (Reference 1). According to the National Oceanic and Atmospheric Administration (NOAA), average daily temperatures for LaPorte County range from 72 degrees Fahrenheit (F) in summer to 26 degrees F in winter. For the period of record between 1971 and 2000, annual average precipitation is approximately 40.8 inches (Reference 3).

The City of LaPorte is located in central LaPorte County. LaPorte is surrounded in all directions by unincorporated LaPorte County. According to STATS Indiana, the projected population of LaPorte in 2005 was 21,092 (Reference 2). The major routes through LaPorte are U.S. Route 35 and State Routes 2 and 4.

The Town of LaCrosse is located in southwestern LaPorte County. LaCrosse is surrounded in all directions by unincorporated LaPorte County. According to STATS Indiana, the projected population of LaCrosse in 2005 was 561 (Reference 2). The major routes through LaCrosse are U.S. Route 421 and State Route 8.

The Town of Long Beach is located in northwestern LaPorte County. Long Beach is bordered by the City Michigan City to the southwest, Lake Michigan to the northwest, unincorporated LaPorte County to the southeast, and the City of Michiana Shores to the northeast. According to STATS Indiana, the projected population of Long Beach in 2005 was 1,554 (Reference 2). The major route through Long Beach is U.S. Route 12.

The City of Michiana Shores is located in northwestern LaPorte County. Michiana Shores is bordered by Berrien County, Michigan to the north, Lake Michigan to the northwest and unincorporated LaPorte County in the remaining directions. According to STATS Indiana, the projected population of Michiana Shores in 2005 was 334 (Reference 2). The major route through Michiana Shores is U.S. Route 12.

The City of Michigan City is situated in northwestern LaPorte County, approximately 55 miles southeast of the downtown loop area of Chicago and approximately 35 miles directly west of South Bend, Indiana. Michigan City is bounded by Michiana shores, Duneland Beach, Long beach and Lake Michigan on the north, and Porter County on the east. The remaining city boundary is surrounded by unincorporated areas of LaPorte County. According to STATS Indiana, the projected population of Michigan City in 2005 was 32,205 (Reference 2). The major routes through Michigan City are U.S. Routes 20, 35, and 421, and State Route 212.

## 2.3 Principal Flood Problems

There are several areas in Michigan City that have flooding problems. These problems, in general, are due to poor drainage or inadequate storm sewer facilities as opposed to streams overflowing their banks. The most significant of these areas lies in the northern portion of the Knapp neighborhood south of the Chessie System, west of Wabash Street, and north of Earl Road. The cause of this flooding and similar flooding in other portions of Michigan City has been the growth in the city since the original trunk sewers were built. This growth and the resulting in the sewer backup and runoff have overtaxed the original system resulting in sewer backup and shallow flooding. In the Knapp neighborhood, the trunk line under the Chessie System is the inadequate portion of that line. A similar flooding problem exists along the Chessie System and Greenfield Avenue between Woodland Avenue and Davidson. Another area with drainage difficulties is the western half of the South Lake Michigan Industrial Park. This area, bordered by Freyer Road, Eastwood Road, Tryon Road, and State Route 212, drains very poorly due to a very high water table.

## 2.4 Flood Protection Measures

The only stream in Michigan City with flood protection measures is Trail Creek near its mouth. Much of the bank of Trail Creek downstream of the Sixth Street Bridge has been reinforced by high concrete and steel walls. As a result, very little of this area of Michigan City is subject to flooding from either Lake Michigan or Trail Creek high water (Reference 1).

In order to help prevent or reduce potential losses due to flooding in the city, the Michigan City Planning Commission has passed a zoning ordinance defining permissible development in a flood plain. This ordinance states that:

> No building or structure shall hereafter be erected or enlarged within a floodway which is that area adjoining a river, stream or other drainage way which is required for the flowage of water during periods of high water. No building or structure shall hereafter be erected or enlarged with a ground floor elevation less than three feet above the flood crest elevation within any flood-plain area.

The state of Indiana has also set regulations concerning development in a flood plain. The Indiana Flood Control Act of 1945, as amending, requires that the channels and that portion of the flood plain known as the floodway be kept free and clear of interference or obstructions which could restrict the flow rate in a significant manner. The Act stipulates that the Indiana Flood Plain Management Act of 1973 further requires that flood plain management regulations adopted after July 1, 1974, meet a minimum set of standards for the delineation and regulation of flood hazard areas (Reference 1)

## 3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in LaPorte County, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

### 3.1 Hydrologic Analysis

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting LaPorte County. Table 7 contains a summary of peak discharges for the 10-, 2-, 1-, and 0.2-percent annual chance floods, where applicable, for each flooding source studied in detail in LaPorte County. Peak discharges in the table were compiled from previously effective FIS reports for LaPorte County and incorporated areas. Source citations refer to the source of the detailed study.

Table 7. Summary of Discharges

| Flooding Source And Location | Drainage Area (Square Miles) | Peak Discharge (cfs) 10% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
|---|---|---|---|---|---|
| Beck Ditch | | | | | |
| At mouth | 0.96 | 140 | 275 | 345 | 470 |

Table 7. Summary of Discharges (cont.)

| Flooding Source And Location | Drainage Area (Square Miles) | Peak Discharge (cfs) 10% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
|---|---|---|---|---|---|
| Deer Creek | | | | | |
| At Trail Creek | 4.37 | 590 | 1,060 | 1,310 | 1,790 |
| Above South Shore and South Bend railroad | 3.95 | 560 | 1,010 | 1,240 | 1,690 |
| Above municipal golf Course dam | 2.47 | 430 | 770 | 965 | 1,310 |
| Above Golfview road | 2.00 | 360 | 655 | 815 | 1,110 |
| Above tributary at Drive-in theatre | 1.40 | 285 | 515 | 640 | 875 |
| Kimball Ditch | | | | | |
| At mouth | 1.29 | 310 | 545 | 680 | 935 |
| North Branch Deer Creek | | | | | |
| At mouth | 0.96 | 215 | 395 | 490 | 675 |
| At dam | 0.84 | 194 | 360 | 445 | 610 |
| Above Chicago south shore And South Bend railroad | 0.65 | 165 | 300 | 370 | 505 |
| Otter Creek | | | | | |
| At mouth | 1.30 | 175 | 345 | 435 | 585 |
| Above Beck Ditch | 0.29 | 65 | 125 | 160 | 200 |
| Striebel Arm – Kintzele Ditch | | | | | |
| Kintzele Ditch at Corporate limit | 5.09 | 270 | 524 | 629 | 833 |
| Just Upstream of Kintzele Ditch | 3.01 | 160 | 245 | 275 | 400 |
| Just Upstream of Hitchcock Road | 2.60 | 145 | 210 | 230 | 360 |
| Approximately 3,000 feet Upstream of Hitchcock Road | 2.23 | 115 | 155 | 175 | 330 |
| Approximately 600 feet Upstream of Earl Road | 1.87 | 82[1] | 99[1] | 105[1] | 248[1] |

[1] Decrease in flow due to Earl Road Detension Basin

Table 7. Summary of Discharges (cont.)

| Flooding Source And Location | Drainage Area (Square Miles) | Peak Discharge (cfs) 10% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
|---|---|---|---|---|---|
| Approximately 2,300 feet Upstream of Earl Road | 1.87 | 415 | 640 | 720 | 830 |
| Just Upstream of U.S. Route 20 | 1.47 | 370 | 560 | 630 | 680 |
| Approximately 900 feet Upstream of U.S. Route 20 | 0.56 | 120 | 185 | 210 | 300 |
| Trail Creek | | | | | |
| At Lake Michigan | 59.1 | 1,820 | 2,720 | 3,200 | 4,300 |
| At USGS gage | 54.1 | 1,720 | 2,590 | 3,000 | 4,070 |
| White Ditch | | | | | |
| Michiana Drive | 19.5 | * | * | 1,570 | * |
| Oakdale Drive | 19.1 | * | * | 1,550 | * |
| Limit of Michigan City FIS | 18.7 | * | * | 1,530 | * |
| At corporate limit | 7.56 | 695 | 1,220 | 1,530 | 2,060 |
| Above Kimball Ditch | 6.26 | 525 | 975 | 1,220 | 1,620 |

Standard and accepted hydrologic methods were used to develop discharge data on the study streams in LaPorte County. These data were coordinated with the Indiana Department of Natural Resources, the Natural Resources Conservation Service (formally the Soil Conservation Service), the U. S. Geological Survey and the Louisville District of the U. S. Army Corps of Engineers, through a Memorandum Of Understanding dated May 6, 1976. Discharge curves for the 10%, 2%, 1%, and 0.2% annual chance floods were developed for each study stream using several different procedures and compared for consistency.

## 3.2 Hydraulic Analysis

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly

reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to us the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

Cross sections for the backwater analyses were obtained from a variety of sources including: physical survey data, IDNR contour mapping, USGS topographic mapping.

Water-surface elevations for floods of the selected recurrence intervals were computed through use of the USACE HEC-2 step-backwater computer program for streams originally studied in the City of Michigan City Flood Insurance Study. For the new approximate study reaches, the USACE HEC-RAS program was used. HEC-RAS is an updated version of the HEC-2 program used to perform step-backwater analyses.

Flood profiles were prepared for all streams studied by detailed methods and show computed water-surface elevations to an accuracy of 0.5 feet for floods of the selected recurrence intervals. For this countywide FIS, flood profiles and approved LOMRs have been consolidated into continuous stream reaches and adjusted to reflect the current vertical datum as described in Section 3.3. New profiles have been prepared for the new detailed studies and for the purposes of incorporating the LOMRs described in Section 2.1 above.

Channel and overbank roughness factors (Manning's "n" values) used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. Channel and overbank roughness factors used in the detailed studies are summarized by stream in Table 8.

Table 8. Channel and Overbank Roughness Factors

| | Roughness Coefficients | |
|---|---|---|
| Stream | Main Channel | Overbanks |
| Beck Ditch | 0.065-0.065 | 0.100-0.100 |
| Deer Creek | 0.030-0.060 | 0.032-0.100 |
| Kimball Ditch | 0.035-0.055 | 0.030-0.140 |
| North Branch Deer Creek | 0.020-0.060 | 0.050-0.120 |
| Otter Creek | 0.065-0.065 | 0.100-0.100 |
| Striebel Arm-Kintzele Ditch | 0.035-0.055 | 0.030-0.150 |
| Trail Creek | 0.020-0.045 | 0.030-0.130 |
| White Ditch | 0.045-0.075 | 0.065-0.120 |

For new approximate study areas, analyses were based on field inspection and modeling of the stream reaches using simplified HEC-RAS models. Structural measurements or field surveying was not performed. Cross section geometry was derived from topographic mapping provided the USGS digital elevation model. Starting elevations were assumed to be normal depth.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

## 3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities.

In this revision, a vertical datum conversion of -0.33 was calculated at the centroid of the county and used to convert all elevations in LaPorte County from NGVD29 to NAVD88 using the National Geodetic Survey's VERTCON online utility (VERTCON, 2005).

$$NAVD88 = NGVD29 - 0.33$$

For more information on NAVD88, see the FEMA publication entitled Converting the National Flood Insurance Program to the North American Vertical Datum of 1988 (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

## 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, and the Floodway Data table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

### 4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic mapping.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, V, and VE); and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual chance floodplain boundary is shown on the FIRM (Exhibit 2).

### 4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept,

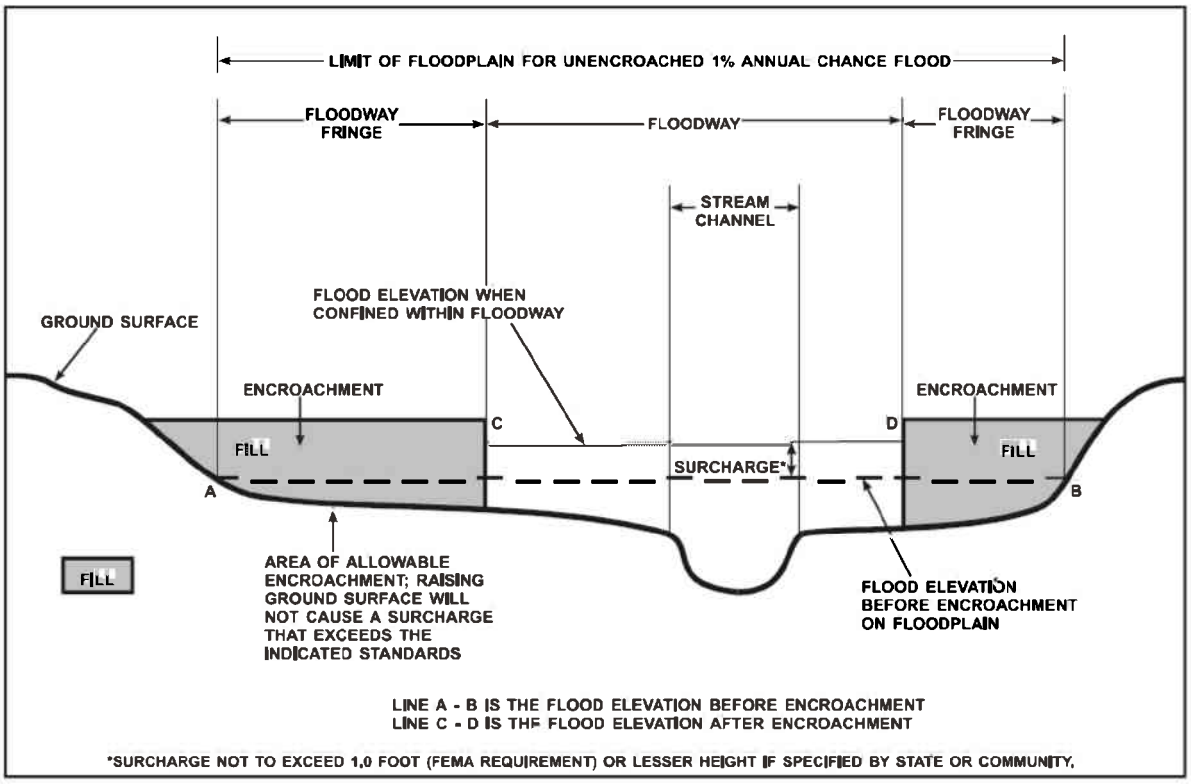
the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The State of Indiana, however, per Indiana Code IC 14-28-1 and Indiana Administrative Code 312 IAC 10, has designated that encroachment in the floodplain is limited to that which will cause no significant increase in flood height. As a result, floodways for this study are delineated based on a flood surcharge of less than 0.15 feet. The floodways in this study were approved by the IDNR, and are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this FIS report and on the FIRM was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections (Table 9). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

**Figure 1: Floodway Schematic**



| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQ. FEET) | MEAN VELOCITY (FT/SEC) | REGULATORY (FEET, NAVD) | WITHOUT FLOODWAY (FEET, NAVD) | WITH FLOODWAY (FEET, NAVD) | INCREASE (FEET) |
| **BECK DITCH** | | | | | | | | |
| A | 0.14 | 113 | 238 | 1.4 | 599.6 | 599.6 | 599.7 | 0.1 |
| B | 0.22 | 62 | 102 | 3.4 | 602.5 | 602.5 | 602.6 | 0.1 |
| **DEER CREEK** | | | | | | | | |
| A | 0.15 | 145 | 501 | 2.6 | 598.4 | 598.4 | 598.5 | 0.1 |
| B | 0.27 | 131 | 511 | 2.6 | 599.8 | 599.8 | 599.9 | 0.1 |
| C | 0.54 | 66 | 344 | 3.6 | 604.7 | 604.7 | 604.7 | 0.0 |
| D | 0.71 | 87 | 254 | 4.9 | 605.3 | 605.3 | 605.4 | 0.1 |
| E | 0.80 | 113 | 679 | 1.8 | 606.0 | 606.0 | 606.1 | 0.1 |
| F | 1.09 | 173 | 1766 | 0.7 | 615.5 | 615.5 | 615.6 | 0.1 |
| G | 1.39 | 89 | 533 | 1.8 | 615.6 | 615.6 | 615.7 | 0.1 |
| H | 1.49 | 99 | 359 | 2.3 | 615.7 | 615.7 | 615.8 | 0.1 |
| I | 1.96 | 185 | 1032 | 0.8 | 624.1 | 624.1 | 624.2 | 0.1 |
| J | 2.05 | 183 | 880 | 0.9 | 624.2 | 624.2 | 624.3 | 0.1 |
| K | 2.32 | 188 | 701 | 0.9 | 630.5 | 630.5 | 630.5 | 0.0 |
| L | 2.42 | 131 | 350 | 1.8 | 630.9 | 630.9 | 630.9 | 0.0 |
| M | 2.51 | 105 | 300 | 2.1 | 632.4 | 632.4 | 632.5 | 0.1 |
| **KIMBALL DITCH** | | | | | | | | |
| A | 0.07 | 509 | 1,157 | 0.6 | 607.5 | 605.3[2] | 605.4 | 0.1 |
| B | 0.27 | 193 | 513 | 1.3 | 607.5 | 606.2[2] | 606.3 | 0.1 |

[1] MILES ABOVE MOUTH

[2] ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM WHITE DITCH



TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

**LAPORTE COUNTY, IN**
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**BECK CREEK - DEER CREEK - KIMBALL DITCH**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | 6 ECTION AREA (SQ. FEET) | MEAN VELOCITY (FT/SEC) | REGULATORY (FEET, NAVD) | WITHOUT FLOODWAY (FEET, NAVD) | WITH FLOODWAY (FEET, NAVD) | INCREASE (FEET) |
| **NORTH BRANCH DEER CREEK** | | | | | | | | |
| A | 0.02 | 106 | 317 | 1.5 | 615.7 | 609.0 [2] | 609.1 | 0.1 |
| B | 0.07 | 84 | 265 | 1.9 | 615.7 | 609.2 [2] | 609.2 | 0.1 |
| C | 0.33 | 143 | 268 | 1.8 | 619.2 | 619.2 | 619.3 | 0.1 |
| D | 0.49 | 359 | 1772 | 0.3 | 628.0 | 628.0 | 628.1 | 0.1 |
| E | 0.61 | 106 | 865 | 0.5 | 628.0 | 628.0 | 628.1 | 0.1 |
| F | 0.81 | 311 | 1163 | 0.3 | 629.4 | 629.4 | 629.5 | 0.1 |
| G | 0.97 | 150 | 254 | 1.5 | 632.9 | 632.9 | 632.9 | 0.0 |
| **OTTER CREEK** | | | | | | | | |
| A | 0.13 | 96 | 207 | 2.1 | 592.1 | 591.6 [3] | 591.7 | 0.1 |
| B | 0.23 | 120 | 224 | 1.9 | 594.6 | 594.6 | 594.7 | 0.1 |
| C | 0.42 | 54 | 85 | 1.9 | 600.5 | 600.5 | 600.6 | 0.1 |
| D | 0.48 | 32 | 63 | 2.5 | 605.2 | 605.2 | 605.3 | 0.1 |
| **STRIEBEL ARM-KINTZELE DITCH** | | | | | | | | |
| A | 0.74 [4] | 30 | 146 | 1.9 | 616.3 | 616.3 | 616.4 | 0.1 |
| B | 0.80 [4] | 40 | 203 | 1.4 | 616.6 | 616.6 | 616.7 | 0.1 |
| C | 0.93 [4] | 32 | 349 | 1.6 | 617.2 | 617.2 | 617.2 | 0.0 |
| D | 1.29 [4] | 428 | 1476 | 0.2 | 617.9 | 617.9 | 618.0 | 0.1 |
| E | 1.47 [4] | 35 | 158 | 1.5 | 618.1 | 618.1 | 618.1 | 0.0 |
| F | 1.59 [4] | 27 | 97 | 1.8 | 618.2 | 618.2 | 618.3 | 0.1 |
| G | 1.86 [4] | 20 | 73 | 2.4 | 620.2 | 620.2 | 620.2 | 0.0 |
| H | 2.11 [4] | 840 [5] | 187 | 0.6 | 627.6 | 627.6 | 627.6 | 0.0 |
| I | 2.49 [4] | 23 | 89 | 8.1 | 630.1 | 630.1 | 630.1 | 0.0 |
| J | 2.84 [4] | 179 | 788 | 0.9 | 636.5 | 636.5 | 636.5 | 0.0 |
| K | 3.04 [4] | 77 | 385 | 1.4 | 636.7 | 636.7 | 636.8 | 0.1 |

[1] MILES ABOVE MOUTH
[2] ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM DEER CREEK
[3] ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM TRAIL CREEK
[4] MILES ABOVE COUNTY LINE ROAD
[5] WIDTH INCLUDES EARL ROAD DETENTION BASIN

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

**LAPORTE COUNTY, IN AND INCORPORATED AREAS**

**FLOODWAY DATA**

**NORTH BRANCH DEER CREEK - OTTER CREEK - STRIEBEL ARM/KINTZELE DITCH**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQ. FEET) | MEAN VELOCITY (FT/SEC) | REGULATORY (FEET, NAVD) | WITHOUT FLOODWAY (FEET, NAVD) | WITH FLOODWAY (FEET, NAVD) | INCREASE (FEET) |
| **TRAIL CREEK** | | | | | | | | |
| A | 0.14 | 404 | 8515 | 0.4 | 584.7 | 579.9[3] | 580.0 | 0.1 |
| B | 0.26 | 395 | 8187 | 0.4 | 584.7 | 579.9[3] | 580.0 | 0.1 |
| C | 0.41 | 140 | 1890 | 1.7 | 584.7 | 579.9[3] | 580.0 | 0.1 |
| D | 0.78 | 126 | 678 | 4.7 | 584.7 | 580.0[3] | 580.1 | 0.1 |
| E | 0.85 | 103 | 598 | 5.3 | 584.7 | 580.2[3] | 580.3 | 0.1 |
| F | 1.12 | 118 | 749 | 4.3 | 584.7 | 581.2[3] | 581.3 | 0.1 |
| G | 1.41 | 130 | 640 | 5.0 | 584.7 | 582.8[3] | 582.8 | 0.0 |
| H | 1.62 | 163 | 674 | 4.7 | 584.7 | 584.2[3] | 584.2 | 0.0 |
| I | 1.84 | 78 | 541 | 5.9 | 585.1 | 585.1 | 585.2 | 0.1 |
| J | 2.13 | 415 | 1299 | 2.5 | 586.7 | 586.7 | 586.8 | 0.1 |
| K | 2.38 | 320 | 1073 | 3.0 | 588.2 | 588.2 | 588.3 | 0.1 |
| L | 2.63 | 315[2] | 1021 | 3.1 | 590.9 | 590.9 | 591.0 | 0.1 |
| M | 3.55 | 505 | 1503 | 2.0 | 592.6 | 592.6 | 592.7 | 0.1 |
| N | 4.04 | 549 | 1140 | 2.6 | 594.4 | 594.4 | 594.5 | 0.1 |
| O | 4.18 | 232 | 795 | 3.8 | 594.6 | 594.6 | 594.6 | 0.0 |
| P | 4.52 | 229 | 984 | 3.0 | 598.5 | 598.5 | 598.6 | 0.1 |
| Q | 4.74 | 956 | 4635 | 0.6 | 599.8 | 599.8 | 599.9 | 0.1 |
| R | 5.04 | 223 | 1405 | 2.0 | 601.8 | 601.8 | 601.9 | 0.1 |
| **WHITE DITCH** | | | | | | | | |
| A | 1.05 | 110 | 569 | 2.8 | 606.1 | 606.1 | 606.1 | 0.0 |
| B | 1.20 | 250 | 1061 | 1.5 | 606.4 | 606.4 | 606.4 | 0.0 |
| C | 1.32 | 311 | 1109 | 1.4 | 606.9 | 606.9 | 606.9 | 0.0 |
| D | 1.40 | 420 | 2023 | 0.8 | 607.1 | 607.1 | 607.1 | 0.0 |
| E | 1.57 | 545 | 1923 | 0.8 | 607.2 | 607.2 | 607.3 | 0.1 |
| F | 1.66 | 585 | 2283 | 0.7 | 607.4 | 607.4 | 607.5 | 0.1 |

[1] MILES ABOVE MOUTH

[2] THIS WIDTH EXTENDS BEYOND CORPORATE LIMITS

[3] ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM LAKE MICHIGAN



TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

**LAPORTE COUNTY, IN AND INCORPORATED AREAS**

**FLOODWAY DATA**

**TRAIL CREEK - WHITE DITCH**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQ. FEET) | MEAN VELOCITY (FT/SEC) | REGULATORY (FEET, NAVD) | WITHOUT FLOODWAY (FEET, NAVD) | WITH FLOODWAY (FEET, NAVD) | INCREASE (FEET) |
| WHITE DITCH (CONTINUED) | | | | | | | | |
| G | 1.82 | 500 | 1507 | 1.0 | 607.4 | 607.4 | 607.5 | 0.1 |
| H | 1.90 | 520 | 1772 | 0.9 | 607.4 | 607.4 | 607.5 | 0.1 |
| I | 1.97 | 686 | 2045 | 0.8 | 607.4 | 607.4 | 607.5 | 0.1 |
| J | 2.02 | 616 | 2141 | 0.7 | 607.5 | 607.5 | 607.6 | 0.1 |
| K | 2.54 | 198 | 871 | 1.4 | 611.9 | 611.9 | 612.0 | 0.1 |
| L | 2.66 | 172 | 606 | 2.0 | 612.4 | 612.4 | 612.5 | 0.1 |

[1] MILES ABOVE MOUTH
[2] THIS WIDTH EXTENDS BEYOND CORPORATE LIMITS



TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

**LAPORTE COUNTY, IN**
**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**WHITE DITCH**

## 5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are lessthan 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

## 6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current FIRM presents flooding information for the entire geographic area of LaPorte County. Previously, separate FIRMs were prepared for each identified flood prone incorporated community and for the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 10.

## 7.0 OTHER STUDIES

This FIS report either supersedes or is compatible with all previous studies on streams studied in this report and should be considered authoritative for purposes of the NFIP.

## 8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Flood Insurance and Mitigation Division, Federal Emergency Management Agency, Region V, 536 S. Clark Street, 6th Floor, Chicago, IL 60605

## 9.0 BIBLIORAPHY AND REFERENCES


1. Federal Emergency Management Agency, Flood Insurance Study, City of Michigan City, Laporte County, IN, Washington D.C., February 17, 1981.
2. U.S. Department of the Interior, Geological Survey, Water Resources Investigation 35-75, Statistical Summaries of Indiana Streamflow Data, February 1976.
3. Indiana Flood Control Act of 1973, Chapter 318, Acts 1945 as found in IC-1971-13-2-22 and amended by PL 122 Act 1973 and HEA 1156 Acts of 1976.

4. "Population Counts, Estimates and Projections", STATS Indiana, Indiana Business Research Center, Indiana University Kelley School of Business, accessed at www.stats.indiana.edu/pop_totals_topic_page.html.
5. National Oceanic and Atmospheric Administration, National Climatic Data Center, *Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Days, 1971-2000*, Climatography of the United States No. 81, 2002
6. U.S. Army Corps of Engineers, *HEC-2 Water-Surface Profiles Computer Program 723-X6, L202A*, Davis, California, November 1976.
7. Indiana Flood Plain Act of 1973, PL 123 Act 1973, Senate Bill 75, (approved April 17, 1973).
8. U.S. Geological Survey, Surface-Water Data for Indiana, Peak-Flow Data for LaPorte County. http://nwis.waterdata.usgs.gov/in/nwis/peak.
9. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of LaPorte County, Indiana, January 1982.
10. U.S. Army Corps of Engineers for FEMA, Phase I – Revised Report on Great Lakes Open-Coast Flood Levels. Detroit, MI, April 1988.

| COMMUNITY NAME | INITIAL IDENTIFICATION | FLOOD HAZARD BOUNDARY MAP REVISIONS DATE | FIRM EFFECTIVE DATE | FIRM REVISIONS DATE |
|---|---|---|---|---|
| Kingsbury, Town of | TBD | none | TBD | none |
| Kingsford Heights, Town of | TBD | none | TBD | none |
| LaCrosse, Town of [1] | N/A | none | N/A | none |
| La Porte, City of | November 1, 1984 | none | April 1, 1993 | June 4, 1996 |
| La Porte County (unincorporated areas) | December 20, 1974 | June 23, 1978 | January 1, 1987 | June 4, 1996 |
| Long Beach, Town of | March 23, 1973 | none | March 23, 1973 | July 1, 1974 and November 21, 1975 |
| Michiana Shores, City of | TBD | none | TBD | none |
| Michigan City, City of | July 19, 1974 | September 12, 1975 | August 17, 1981 | none |
| Pottawattamie Park, Town of | TBD | none | TBD | none |
| Trail Creek, Town of | TBD | none | TBD | none |
| Wanatah, Town of [1] | N/A | none | N/A | none |
| Westville, Town of | TBD | none | TBD | none |

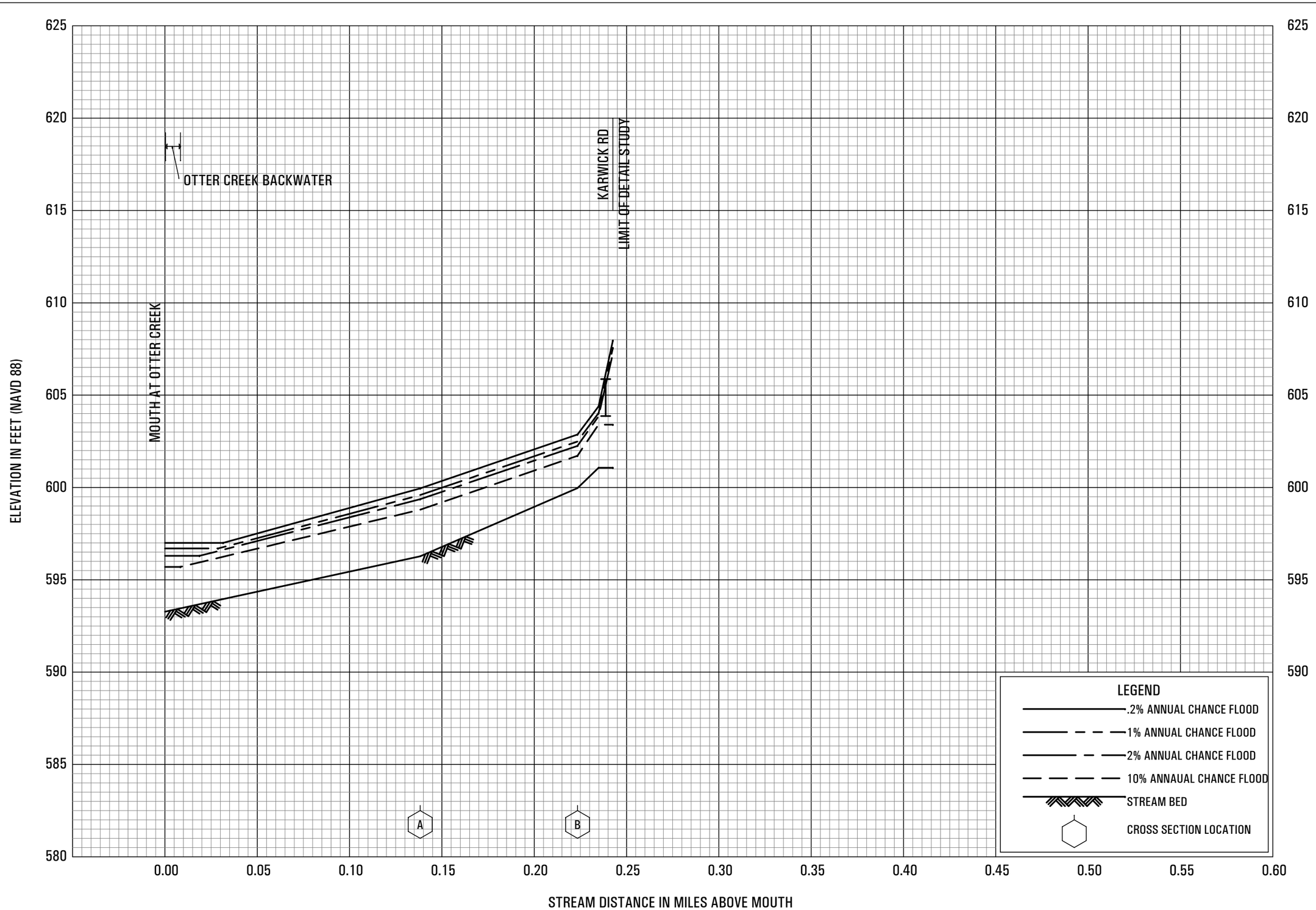
[1] No Special Flood Hazard Areas Identified

**TABLE 10**

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**LAPORTE COUNTY, IN**
**(AND INCORPORATED AREAS)**

**COMMUNITY MAP HISTORY**




FLOOD PROFILES

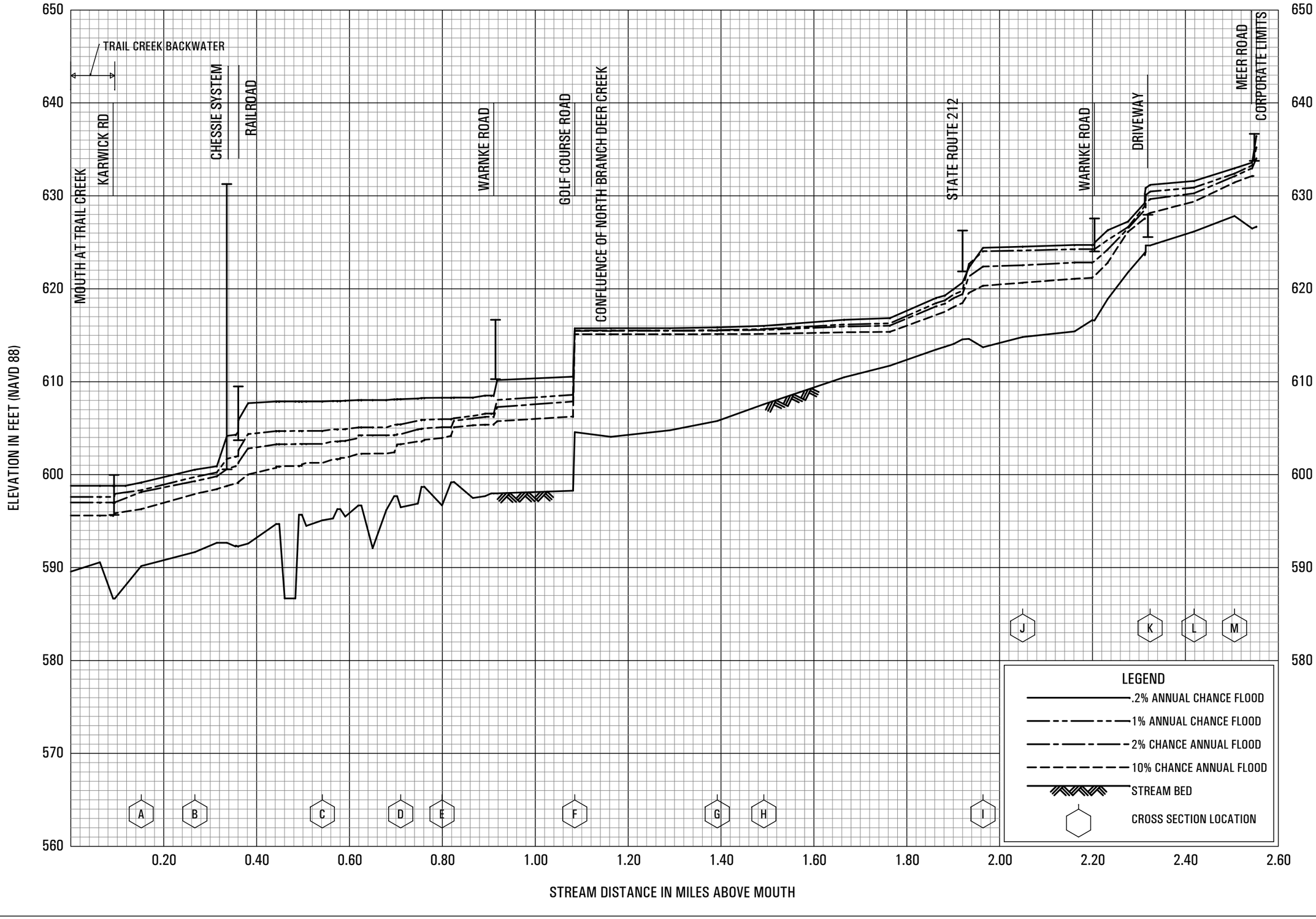
BECK DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

01P




# FLOOD PROFILES

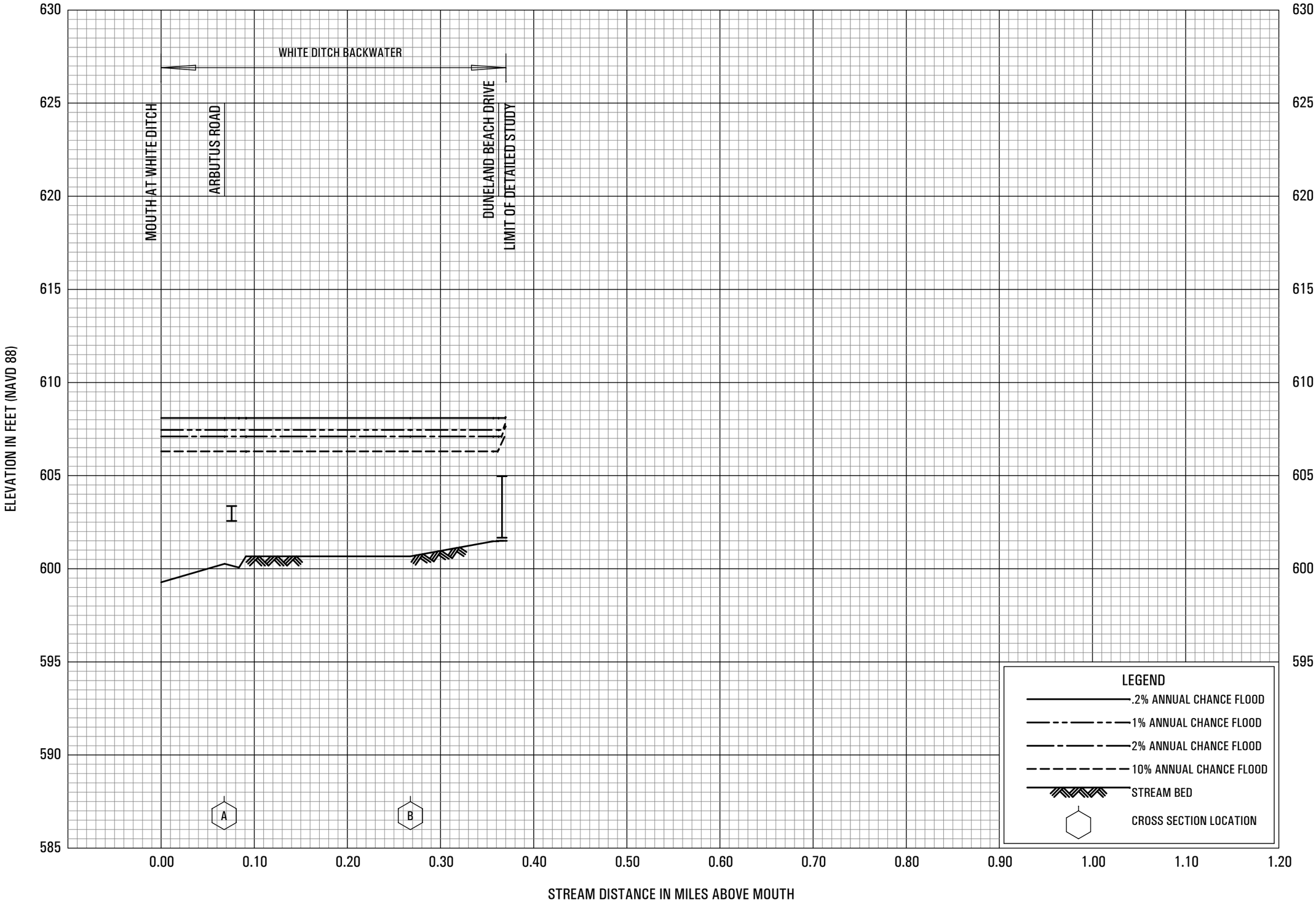
## DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

02P




# FLOOD PROFILES

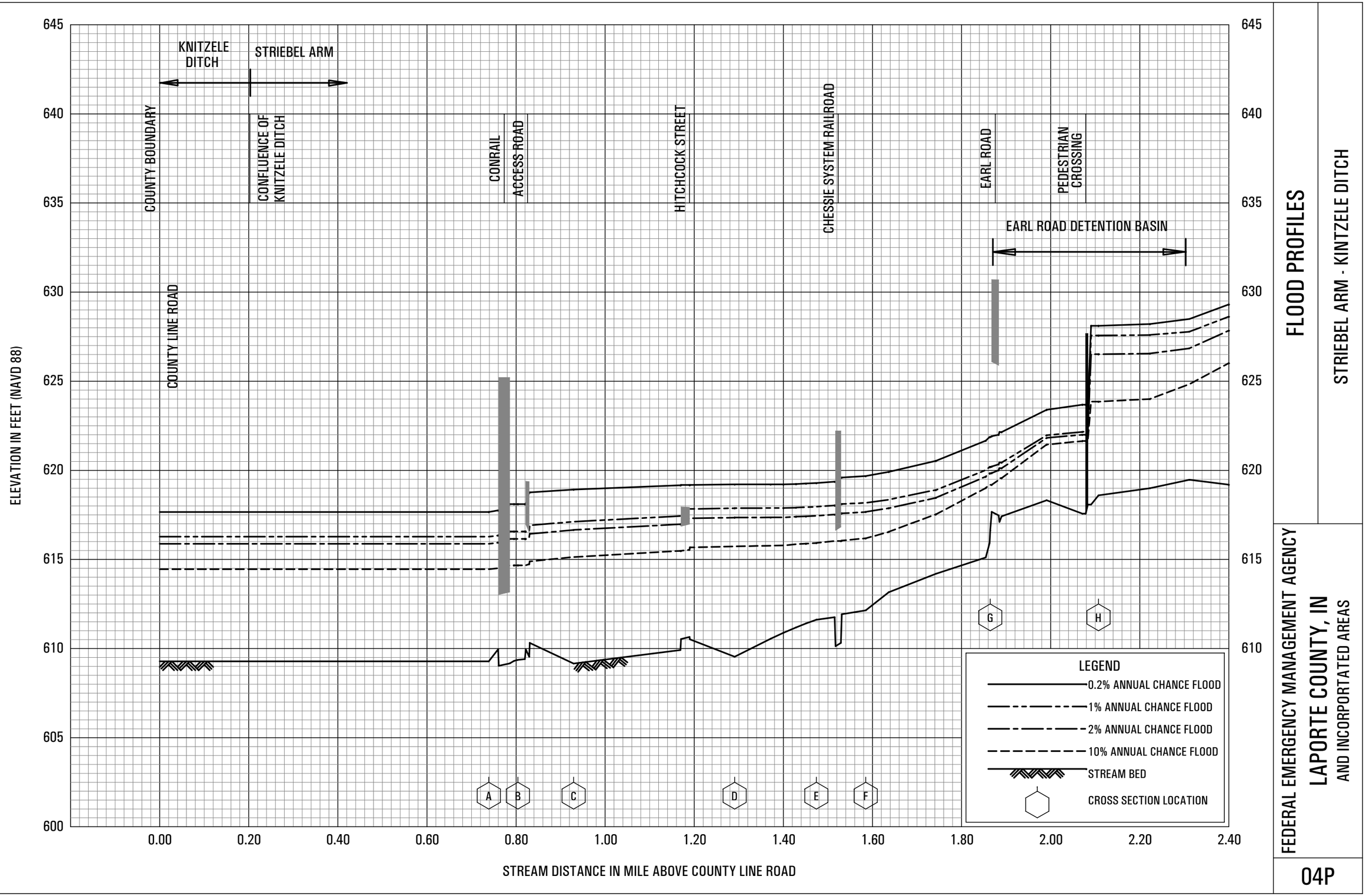
KIMBALL DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

03P




# FLOOD PROFILES

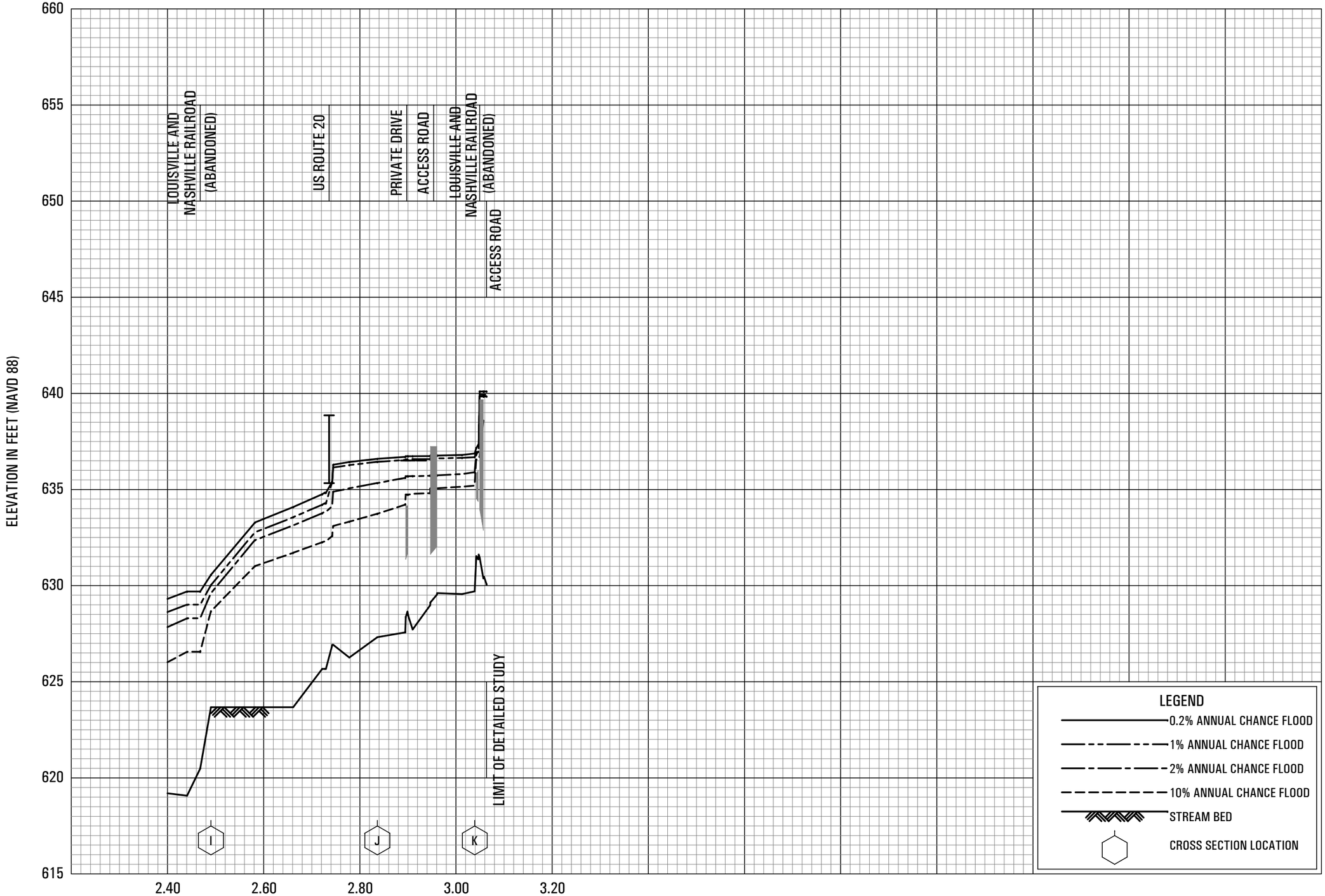
## STRIEBEL ARM - KINTZELE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORTATED AREAS

04P




# FLOOD PROFILES

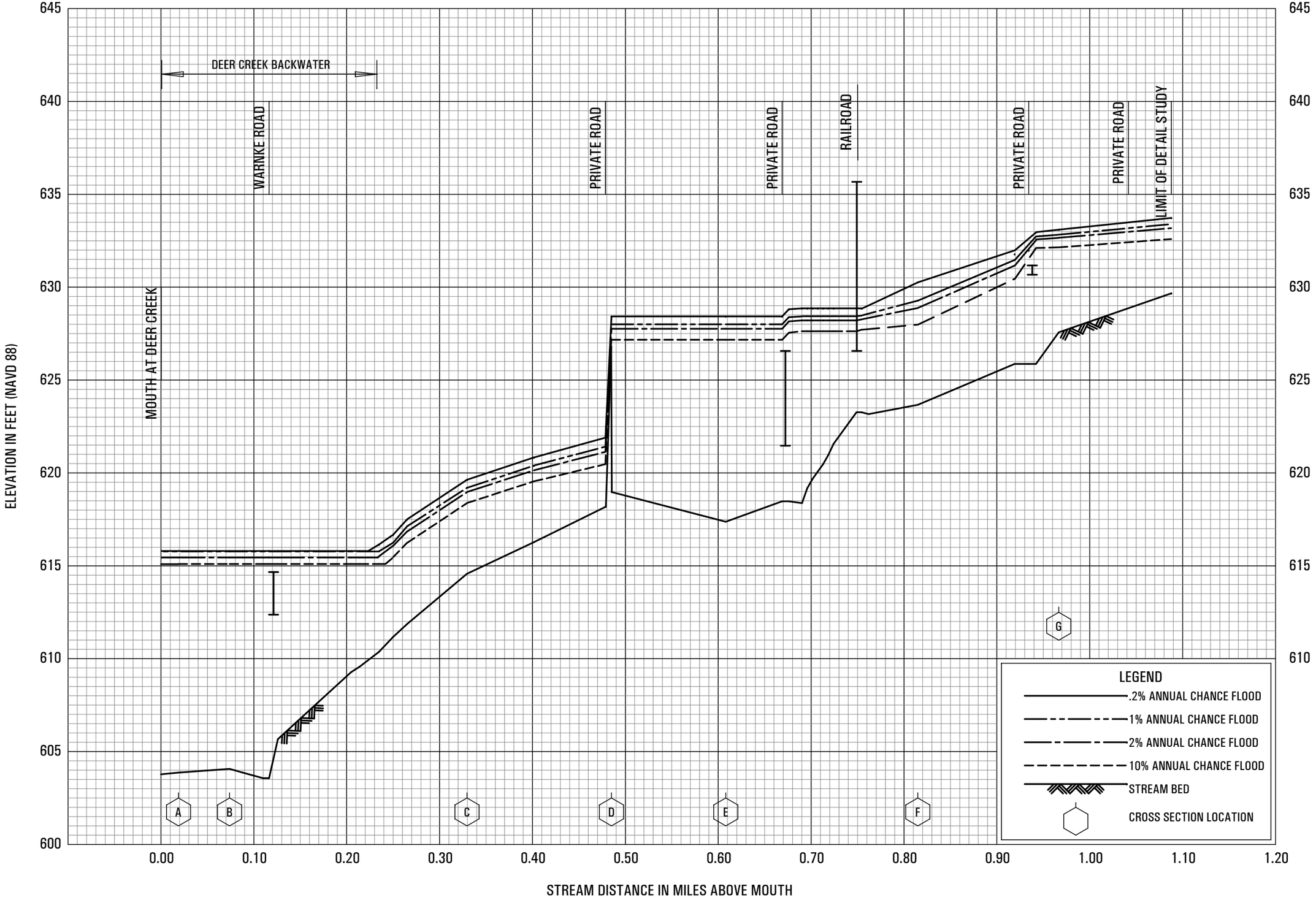
STRIEBEL ARM - KINTZELE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORTATED AREAS

05P




# FLOOD PROFILES

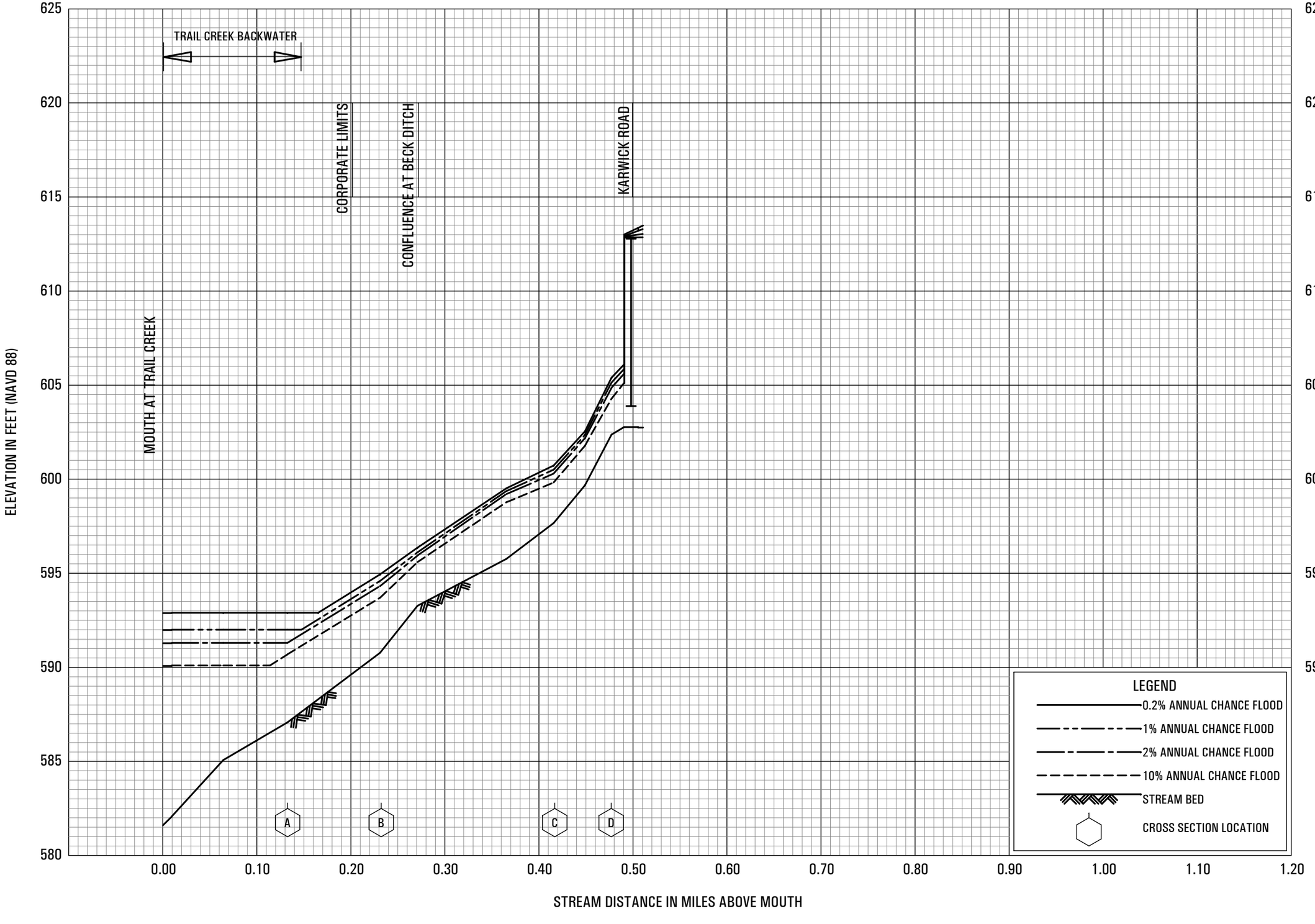
## NORTH BRANCH DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

06P




FLOOD PROFILES

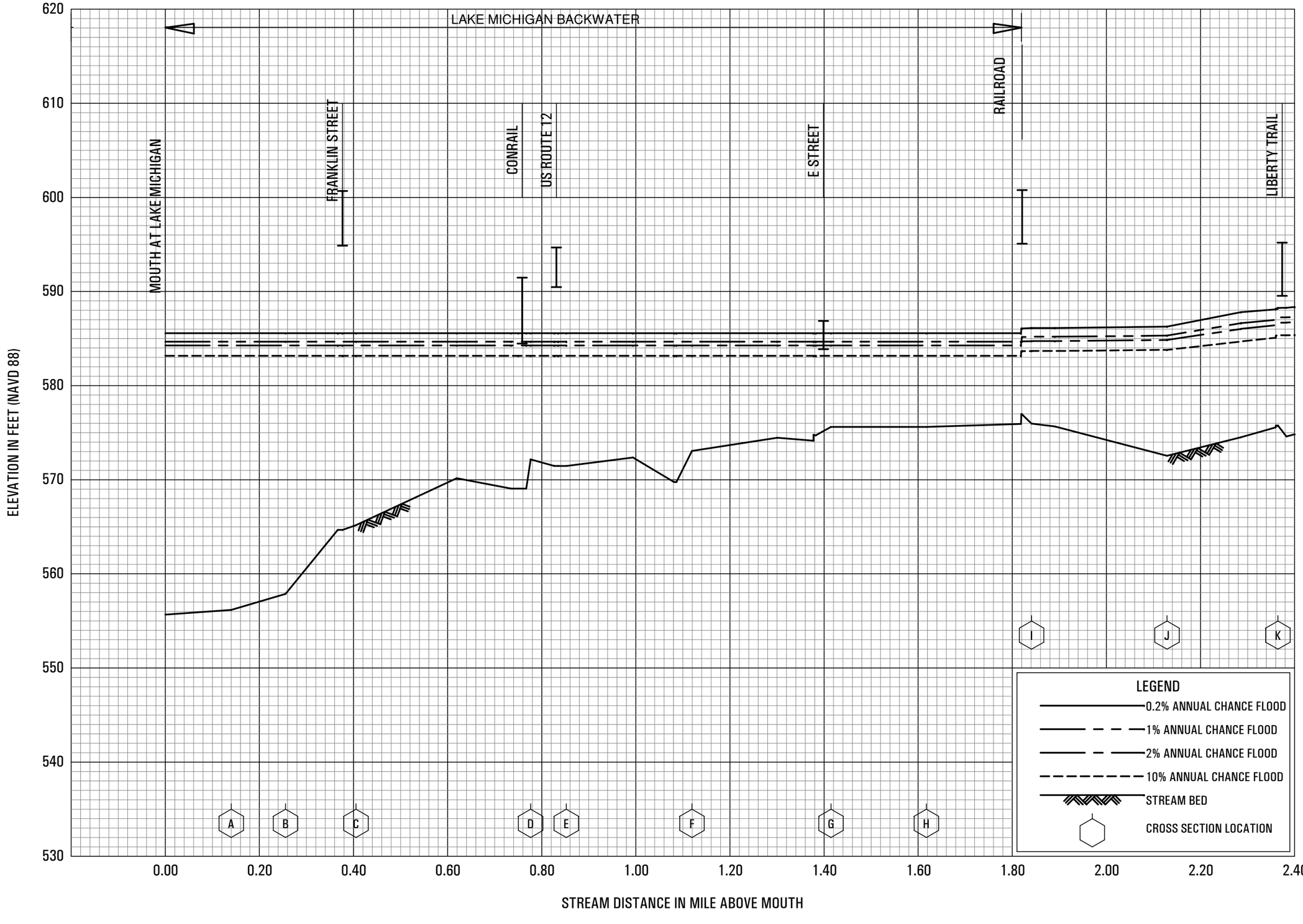
OTTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

07P




FLOOD PROFILES

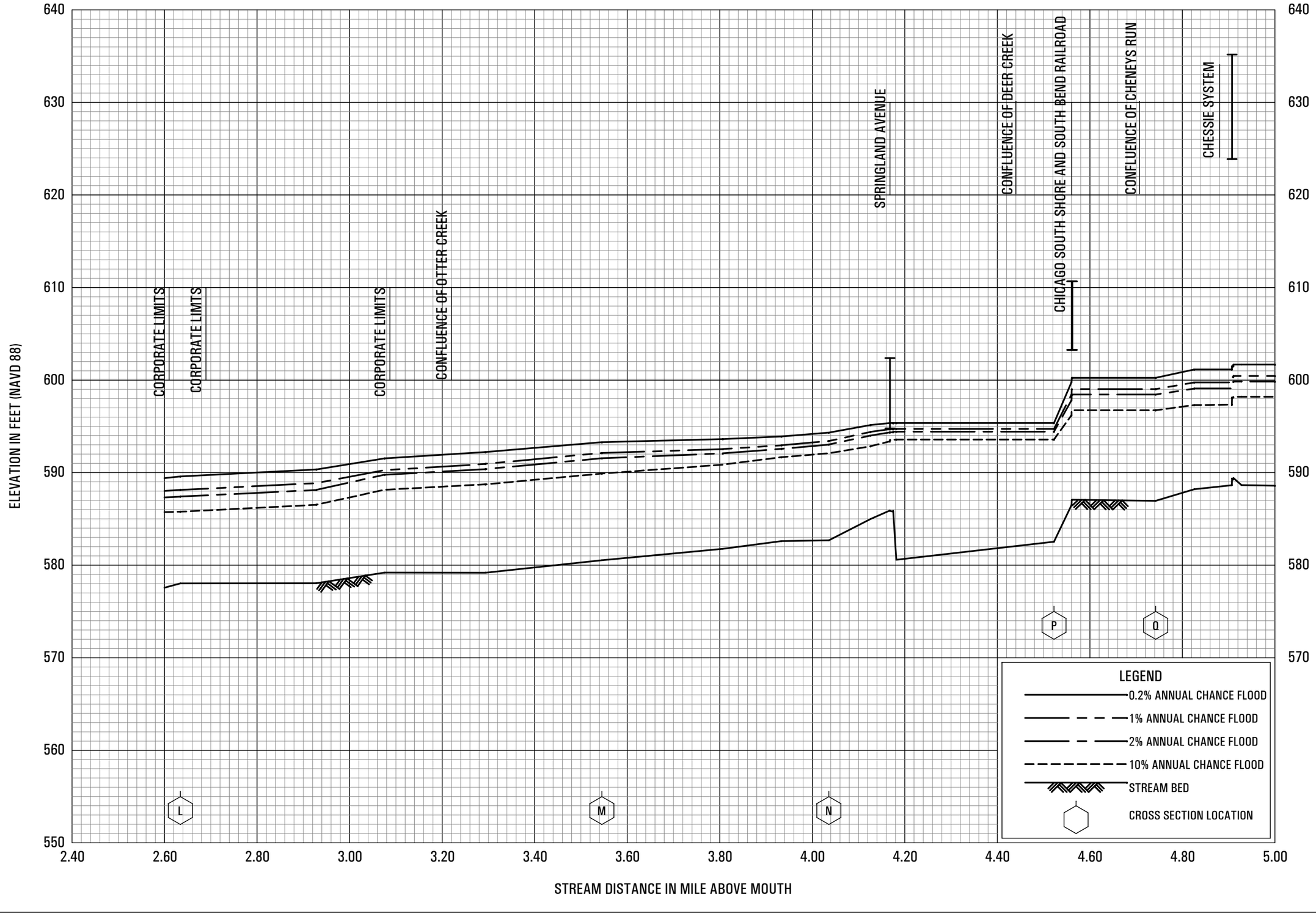
TRAIL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

08P




# FLOOD PROFILES

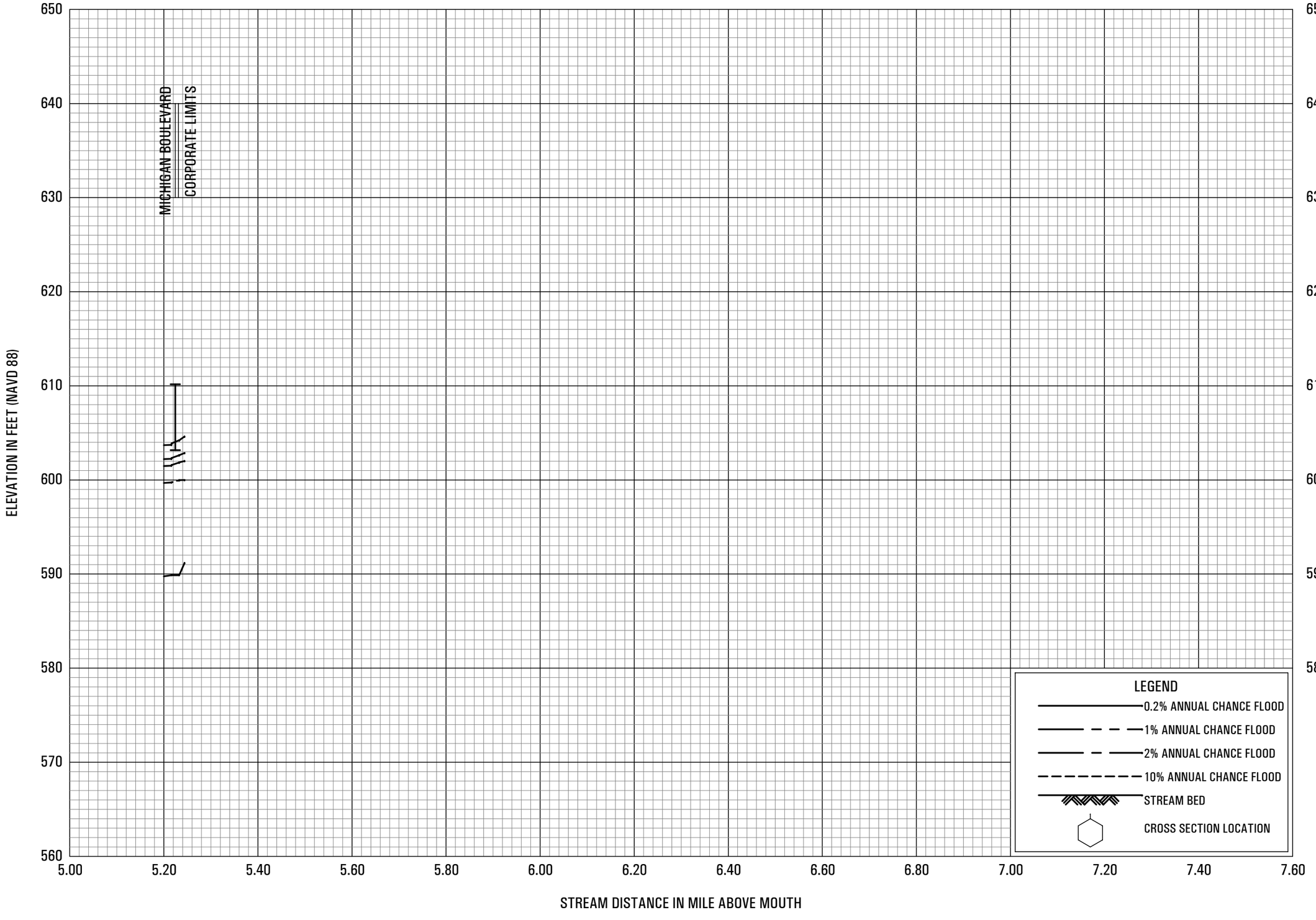
## TRAIL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

09P



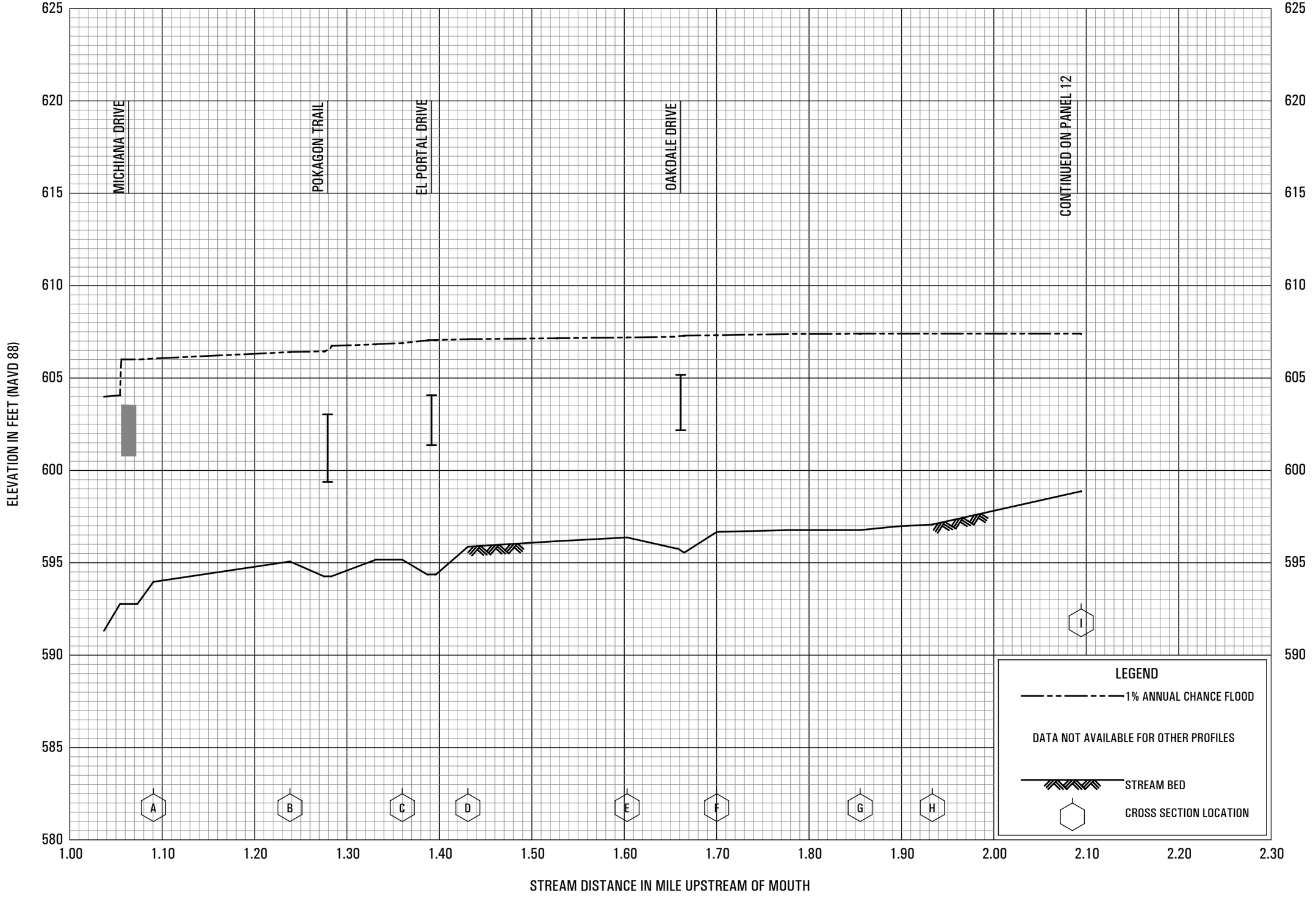

# FLOOD PROFILES

TRAIL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN
AND INCORPORATED AREAS

10P




FLOOD PROFILES

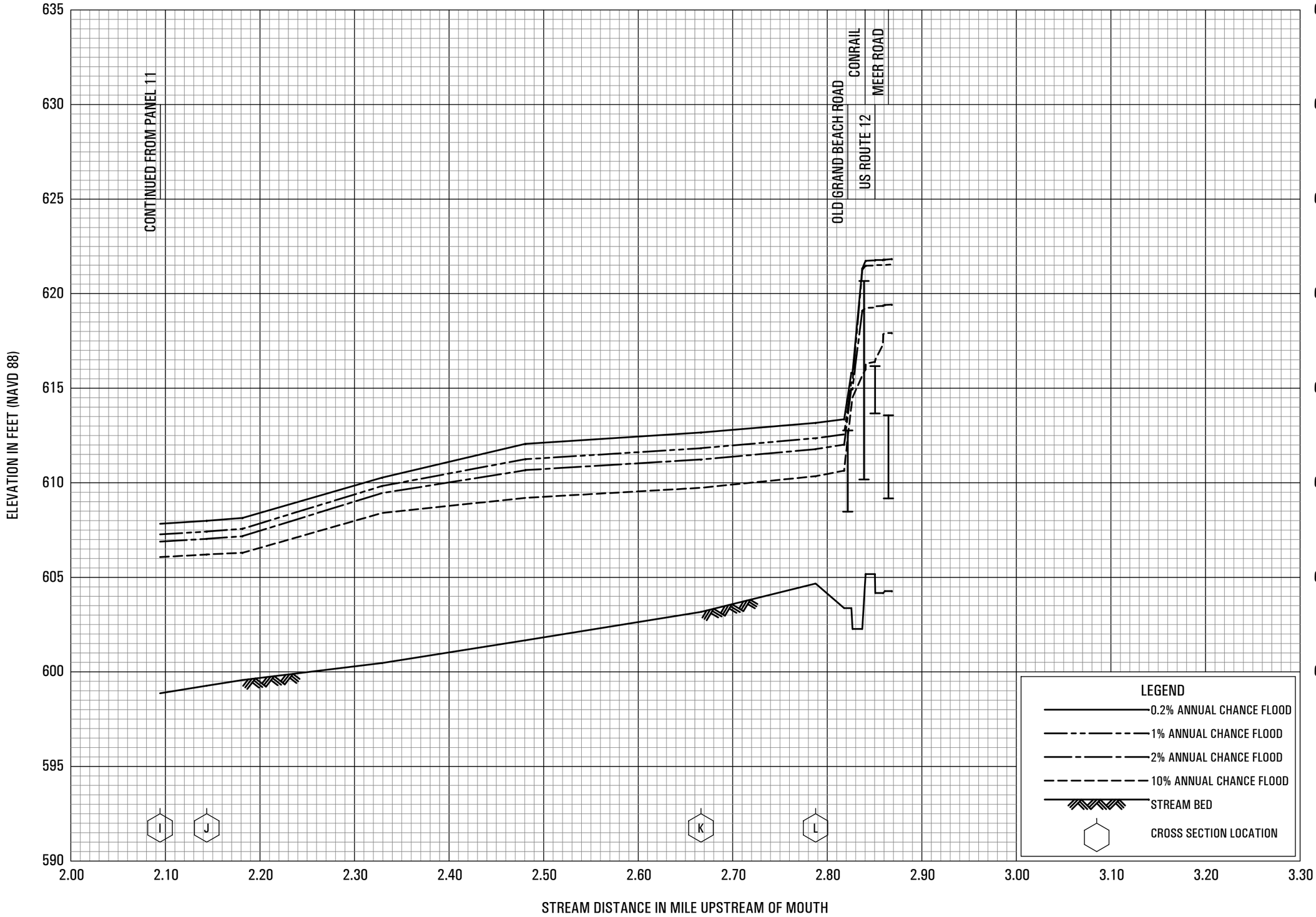
WHITE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

11P




FLOOD PROFILES

WHITE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAPORTE COUNTY, IN

AND INCORPORATED AREAS

12P